

Climate Forecasting and Agricultural Resources

University of Georgia and Tufts University

Funded by the Human Dimensions of Global Change program
National Oceanic and Atmospheric Administration (1998-2005)

Interdisciplinary Team:

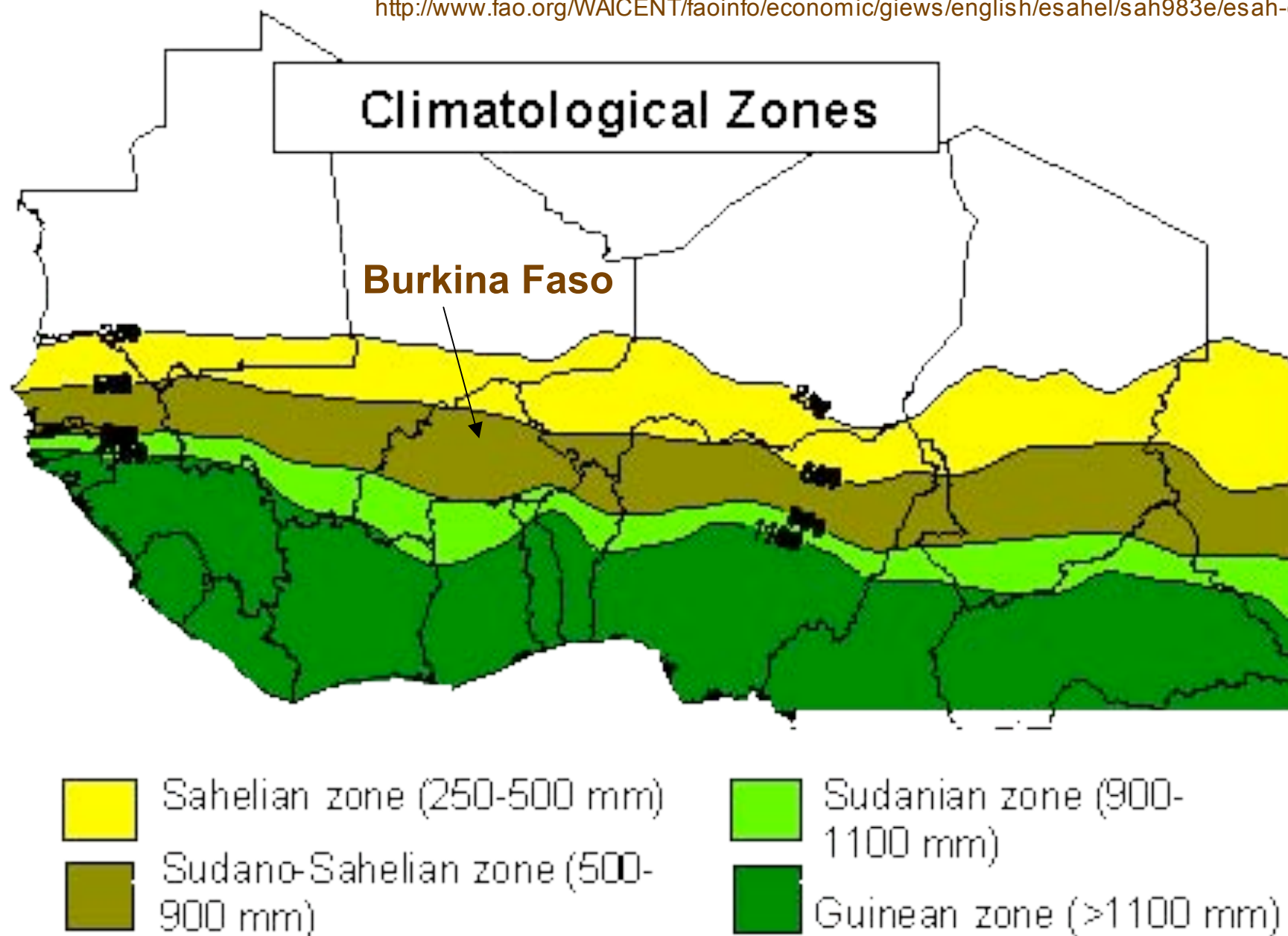
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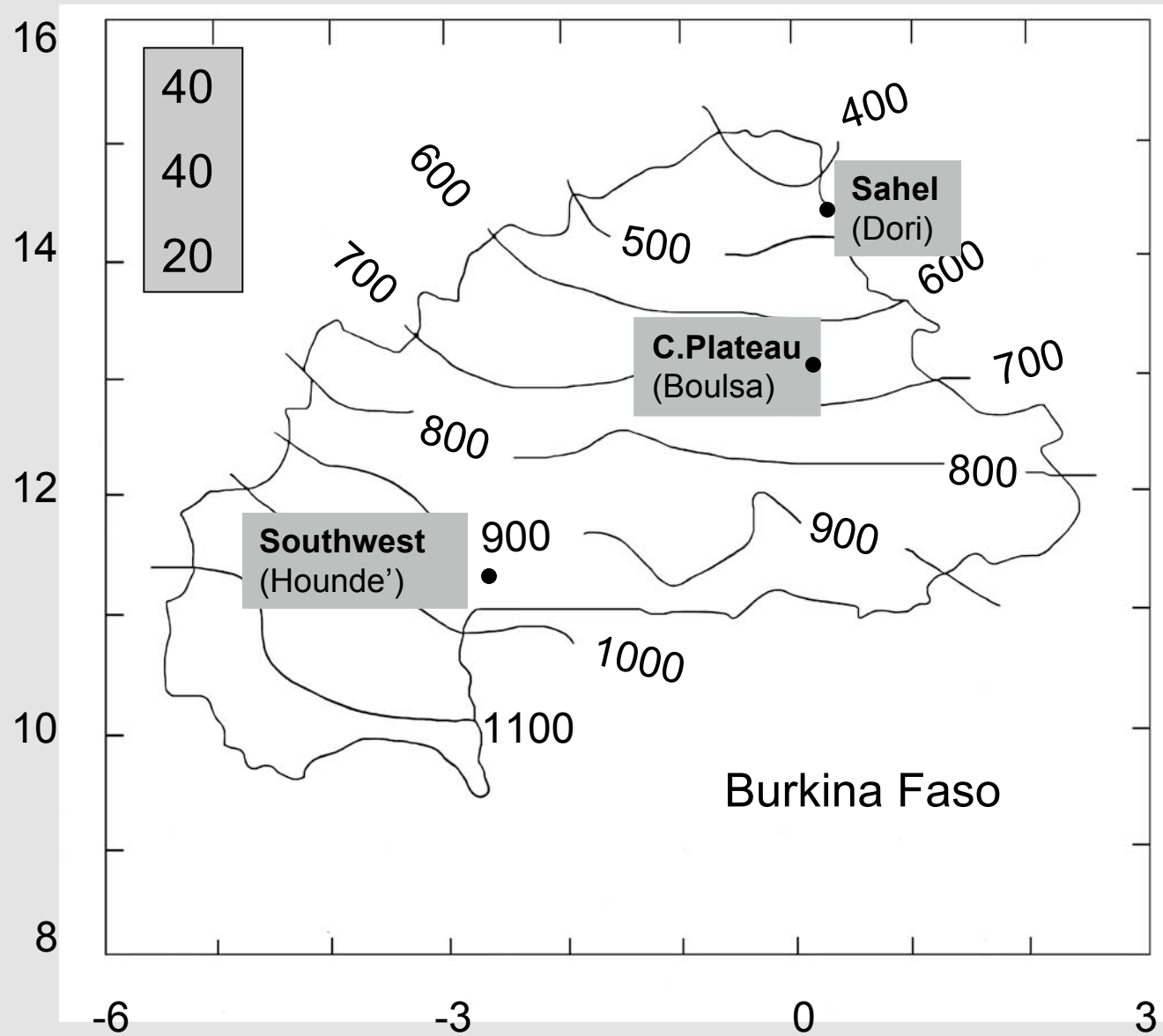


Chris Jost and Salam Bahadio with AlHadji Kormodo



Based on mean annual rainfall 1961-90, SDRN-FAO Rome

Latitude, N



Sahel

Average annual rainfall (1959-1998): 486 mm

Inhabitants mostly by Fulbe, Rimaibe', some Gurmantche' and Bella

Rainfed farming: millet, sorghum, sesame, cowpea, groundnut

All farmwork done by hand



Increasing integration
of crop livestock
production

Gold panning is a main
Source of cash income

Central Plateau

Average annual rainfall (1959-1998): 688.5 mm

Inhabitants: mostly Mossi, some settled Fulbe

Rainfed farming: sorghum, millet, maize, groundnuts, B.gnuts, cowpea, rice

Only 30% of households own plows

Migration is a main source of cash income



Southwest

Average annual rainfall (1959-1998): 930 mm

Inhabitants: local Bwaba, immigrant Mossi, settled and transient Fulbe

Rainfed farming: cotton, maize, sorghum, groundnuts, rice, sesame, beans

All households have plows

A few have tractors

Cotton is the main source
of cash income



Total 2000 ‘seasonal’ rainfall, long-term average rainfall, and rainfall tercile limits (DMN)

Site	2000 rainfall (mm)	40-year average 1960-2000 (mm)	Lower tercile Min / Max (mm)	Middle tercile Min / Max (mm)	Upper tercile Min / Max (mm)
Dori	276	371	215 / 330	343 / 417	419 / 540
Bouls	210	466	210 / 399	403 / 490	493 / 977
a	563	606	362 / 544	547 / 664	672 / 885
Hounde					

Forecasts as global knowledge

African Center for Meteorological Applications to Development

www.acmad.ne



AGRHYMET www.agrhymet.ne

Famine Early Warning System
(FEWS)

SOFITEX memo to field offices advising agents to encourage farmers to plant cotton

*A strong probability of abundant
rainfall from July to September...*

JUN. 16, 1999 5:04PM P. 1
PHONE NO. : 00226 97 00 23+

SOCIETE BURKINABE DES FIBRES TEXTILES
Société Anonyme d'Economie Mixte au Capital de 4.400.000.000, de Francs CFA
Siège Social: BOBO-DIOULASSO - R.C. N° 1556 B

SOFITEX

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Cpte BIR N° 36.012.837 G - BOBO

16 JUIN 1999

CIRCULAIRE N° 026/99
A tout Chef de Région ; Chef de Zone

Objet : Information relative aux prévisions
du régime pluviométrique 99

La campagne agricole 1999/2000 connaît un démarrage difficile lié à l'irrégularité voire l'absence des précipitations dans la plupart des localités de la zone cotonnière. Cette situation précaire qui n'est pas notée seulement au Burkina Faso (le Mali et le nord de la Côte d'Ivoire subissent le même phénomène) est d'une nature à susciter des inquiétudes légitimes et au demeurant un désarroi des producteurs de coton et à avoir pour conséquences une tendance à la réduction des superficies en coton voire un abandon de la culture cotonnière.

Aussi, pour lever toute inquiétude et rassurer les différents acteurs de la filière coton (producteurs et conseillers agricoles), je vous fait parvenir par la présente, les récentes conclusions du forum sur la prévision saisonnière des précipitations en Afrique de l'Ouest, tenu à Dakar du 07 au 09 juin 1999.

Les prévisions qui ont été réalisées par l'ACMAD (Centre Africain des applications de la Météorologie pour le Développement) en collaboration avec les services nationaux de la météo, indiquent une forte probabilité des pluies abondantes au cours de la période de juillet 1999 à septembre 1999.

Du reste les prévisions élaborées par cette agence inter Etatique au cours de la campagne écoulée 1998/99, se sont révélées justes pour la plupart des zones décrites.





Hounde: Mid-July 1999

Bringing forecasts to farmers

Good probability that rainfall will be at least adequate, sufficient
Less than 1999 but more than 1997

- Forecasts are uncertain
- Forecasts relate to zones
- Forecasts relate to Jul-Aug-Sept

Pascal Yaka (DMN), Moussa Sanon (INERA) and Frederic Tiendrebeogo (DPA) explaining the 2000 forecast with farmers



Specialized forecasting knowledge

Some village *marabouts* interpret Koranic verses to predict the future (but orthodox Islam disapproves)

Wahabbite mosque (Sahel)



Bagare' ceremony (Central Plateau)

Diviners can “see” the nature of the rains in rituals



Open-access forecasting knowledge

Most common environmental indicators:

- Fruit production by certain local trees and
- Temperatures during the dry season

Sheanuts (More': *Tanga*) *Butyrospermum parkii*



Salifou Boena (INERA) showing
'sibga' fruits, *Anogeissus leiocarpus*

Open-access forecasting knowledge

Common environmental indicators:



Bird and insect behavior

Fog during dry season

Wind direction during dry season and onset

Level of water in streams, ponds, wells at onset

Moon and star movements

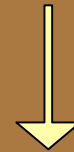
Fulbe herders observe the nesting of quail-like birds (*kobagi*): if they hang high on branches they expect abundant rainfall

Open-access forecasting knowledge

The timing, direction, and nature of the onset of the rainy season is considered the most reliable indicator of the nature of the season



Delayed onset
Rains begin north
Scarce, scattered rains



Drought expected

Farmers' conceptual models of rainfall

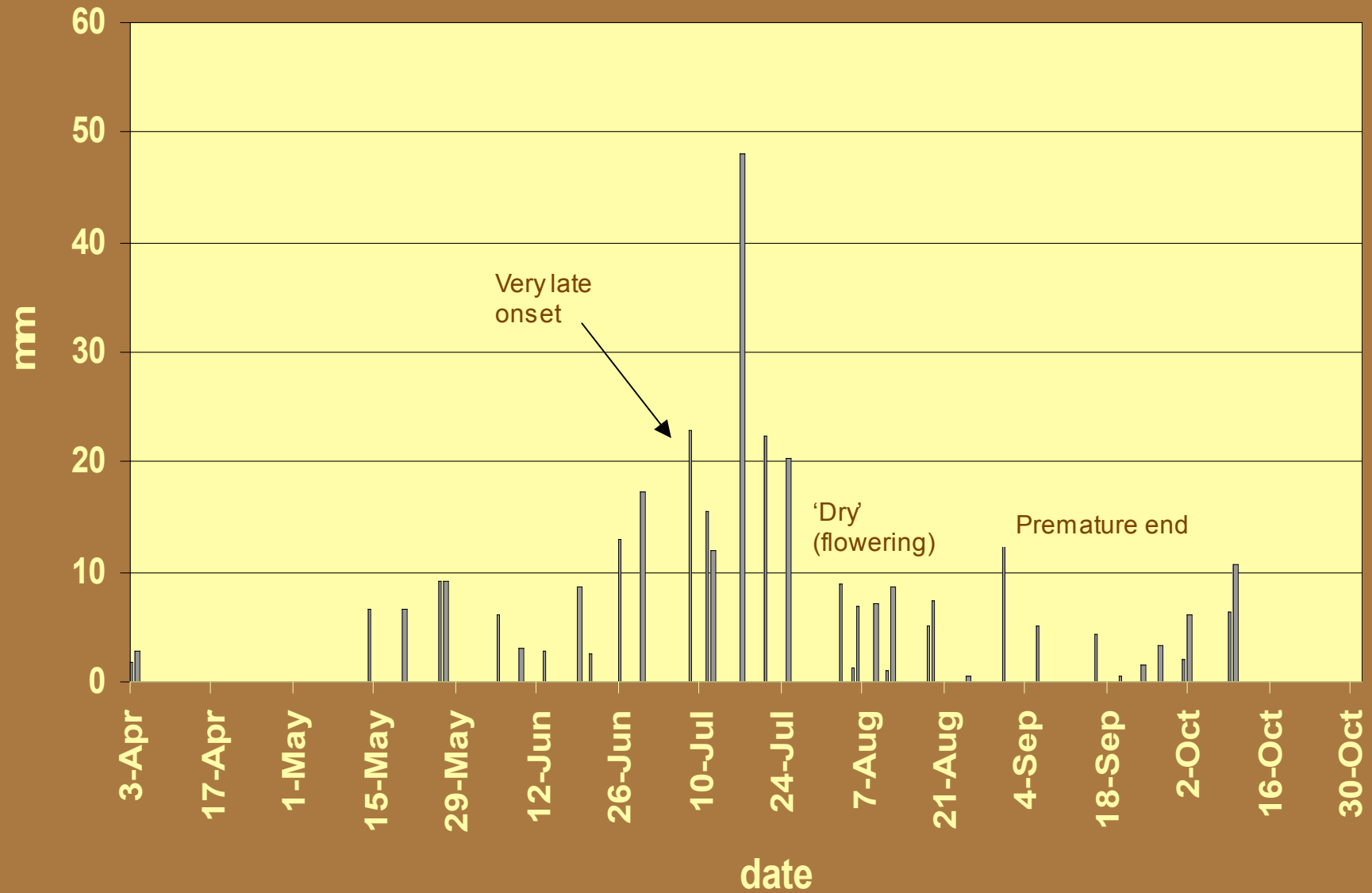
Key parameters:

- Timing and nature of onset and end of rainy season
- Number and timing of 'important' or 'expected' rain events
- Occurrence, duration and timing of dry spells

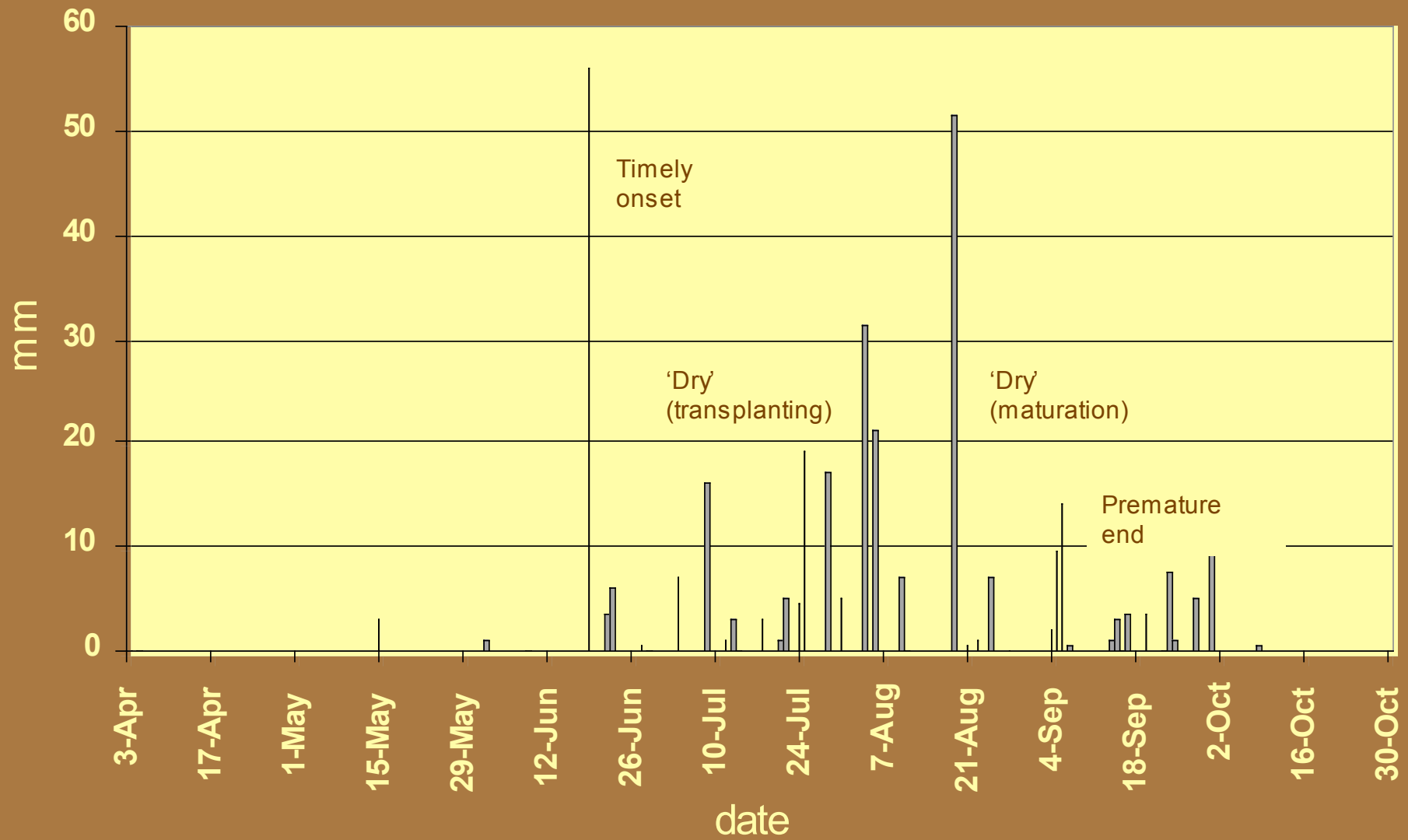


Keith Ingram (UGA) and Fati Dicko discuss the 2000 season with Sahelian herders

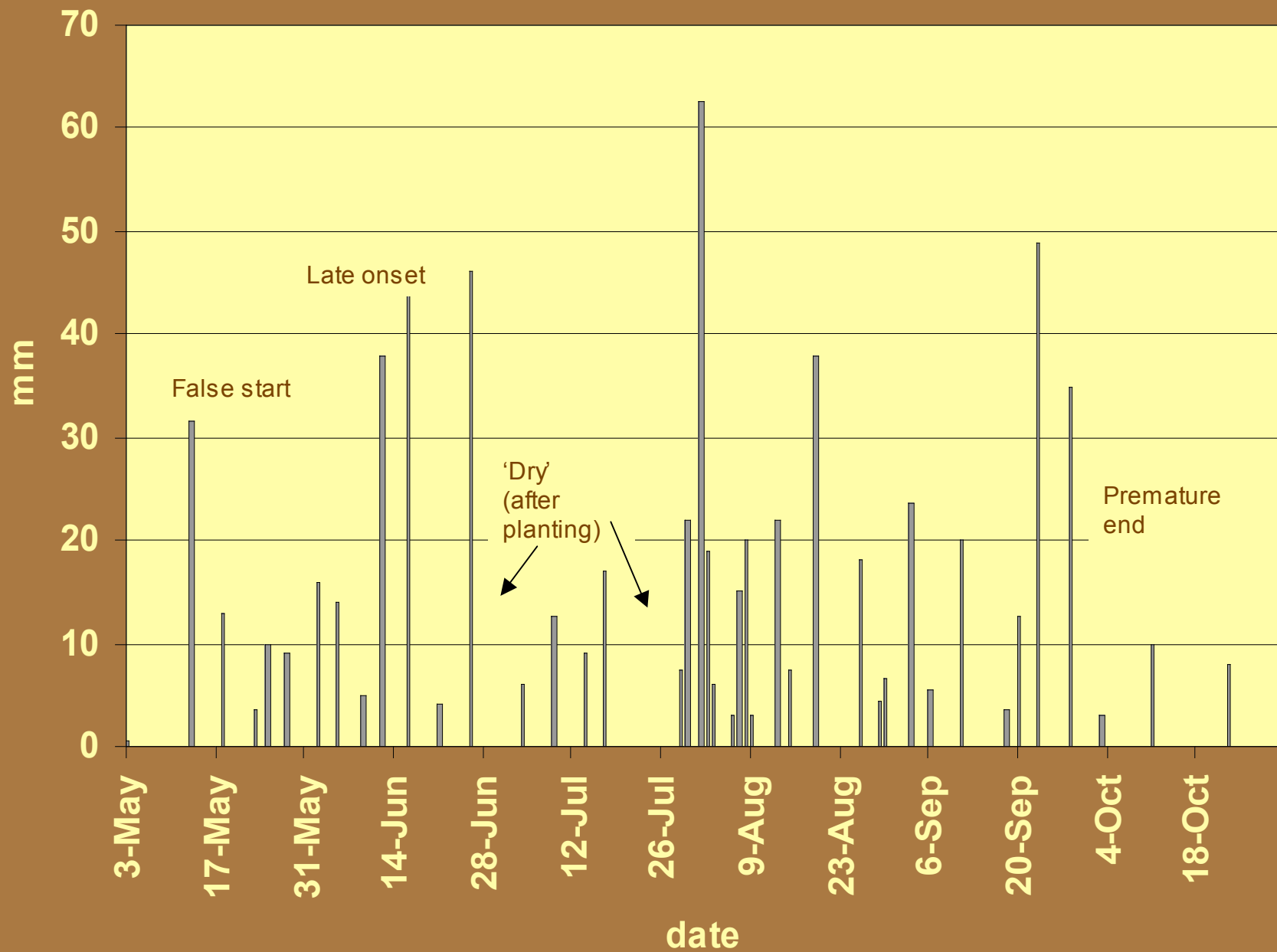
2000 Rainfall, Boulsa, Central Plateau



2000 Rainfall, Dori, Sahel



2000 Rainfall, Bouahoun, Southwest



Farmers' perceptions of and responses to 2000 seasonal forecast

Site	Understanding of forecast	Most common responses to forecast (ranked)
SH N=30	Average, regular 90-day duration	Increase area planted Rehabilitate abandoned fields Purchase seed for secondary crops Increased manure application
CP N=13	Less than average Few big rains 90-day duration Localized rains	Plant shorter duration varieties Increase planting in lowland fields Planted larger areas to compensate x low yields Tilled with plow or tractor before planting
SW N=19	Adequate, not abundant Less than 1999 Some/no dry spells	Plant drought resistant crops and varieties Plow + planted early for better establishment Changed row orientation Reduced input application (to limit debt)

Seasonal rainfall forecasts...

... relevant?

climate science community should intensify efforts toward forecasting parameters that are most salient for farmers.

... sufficient?

communication efforts must be integrated into a policy approach that supports the viability and flexibility of farmers' responses to climate variability.

